Table 1
Cartilage thickness and area in the transplanted and contra-lateral ankle, and knee

Cartilage thickness (ThC.tAB; mm)		TP ankle	CL ankle	[CL knee]
TCJ tibia	[KJ tibia§]	1.01± 0.15	1.08± 0.14	[1.96± 0.36]*
TCJ talus	[KJ fem. condyle§]	1.00± 0.13	1.07± 0.15	[1.79± 0.28]*
STJ talus	[KJ patella]	0.96± 0.16	1.11± 0.19*	[2.30± 0.45]*
STJ calcaneus	[KJ fem. trochlea]	0.86± 0.13	0.97± 0.17*	[1.99± 0.24]*
Total subchondral bone area (tAB, cm^2)				
TCJ tibia	[KJ tibia#]	8.66± 1.35	9.06± 1.51	[22.0± 3.58]*
TCJ talus	[KJ fem. condyle#]	9.70± 1.70	11.33± 1.82*	[11.6± 1.69]*
STJ talus	[KJ patella]	5.57± 1.31	6.14± 1.24	[10.8± 1.63]*
STJ calcaneus	[KJ fem. trochlea]	4.92± 0.97	5.58± 1.06*	[22.0± 2.45]*

* significantly different from the TP ankle (paired t-test at p<0.015 [global sign. level = 0.05])
§ values from the medial and lateral sides averaged; # values added
TCJ = talocrural joint; STJ = subtalar joint; KJ = knee joint; fem = femoral; TP = transplanted; CL = contralateral

were significantly greater in the corresponding knee cartilage plates than in the transplanted talocrural and subtalar joint.
See Table 1: Mean cartilage thickness (ThC.tAB.Me) and subchondral bone area (tAB) in the transplanted (TP) talocrural joint (TCJ) and subtalar joint (STJ), in the contra-lateral (CL) TCJ and STJ, and in the CL knee joint (KJ).
Conclusions: The findings suggest that the cartilage thickness and subchondral bone area of the human ankle (talocrural and subtalar joints) do not adapt, with an increase in thickness or area, to changes in mechanical loading environment, when being transplanted to the site of the knee (van Nees rotationsplasty).

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KNEES WITH MEDIAL MENSICAL PATHOLOGY ARE MORE LIKELY TO UNDERGO TOTAL KNEE REPLACEMENT: A CROSS-SECTIONAL ANALYSIS FROM THE OSTEOARTHRITIS INITIATIVE

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Purpose: Total knee joint replacement (TKR) is a cost-effective procedure with good long-term outcomes. Optimized timing and clear indications for TKR are important to prevent unnecessary replacement of the original joint. However, at present there is no clear consensus on indications for TKR. Imaging biomarkers may be able to aid in the decision making process on a patient level as well as in clinical studies and trials.
Meniscal damage and extrusion are predictors of structural progression of osteoarthritis and thus, meniscal pathology may potentially serve as a candidate marker for TKR.
The aim of this study was to use a matched case-control design to determine if there are differences in presence and severity of meniscal damage and extrusion between cases that had knee replacement vs. matched controls that did not undergo TKR.
Methods: Participants were drawn from the Osteoarthritis Initiative (OAI), a multicenter observational study, including 4796 participants with, or at risk of knee osteoarthritis. We studied knees from 121 OAI participants that underwent TKR before the 48 month visit for the time point prior to TKR, i.e. “T0” (e.g. for a TKR reported at the 48 month (M) visit, T0 = 36M); and 121 control knees that did not undergo TKR that were matched for radiographic disease stage, gender, and age within 5 years and were assessed at the same T0 follow-up visit. MR images were acquired at four OAI clinical centers using dedicated Siemens Trio 3 T scanners. The coronal intermediate weighted (IW) 2D turbo spin-echo (TSE), the sagittal 3D dual echo at steady state (DESS) sequence, coronal and axial multiplanar reformations of the 3D DESS and a sagittal IW fat suppressed TSE sequence were used for semiquantitative assessment.
MRIs were read for medial and lateral meniscal morphology and extrusion using the semiquantitative MOAKS system, which scores meniscal morphology from 0 to 8 with 0 being normal and 8 coding complete meniscal maceration. Morphology was scored for the following locations: anterior horn, body, and posterior horn, for both the medial and lateral menisci. Grades 0 and 1 are considered the reference as a grade 1 depicts intrameniscal signal changes of unknown relevance. Grades 2-5 code different types of meniscal tears while grades 6-8 code different grades of meniscal maceration. Extrusion was graded from 0-3 at the medial and lateral joint lines on the coronal images.
Conditional logistic regression was used to assess the odds of TKR considering different measures of meniscal morphology.
Results: Subjects were on average 65.3 years old (SD ± 8.6), predominantly female (58.1%) and overweight (mean BMI 29.6 SD ± 4.9).
Table 1 demonstrates that knees that underwent TKR were more likely to have maceration of the medial meniscal body (unadjusted OR = 2.78 95% confidence interval [CI] [1.50,5.16]); to have maceration of the posterior horn (OR = 2.20 95% CI [1.07,4.53]); and to have a maximum meniscal scores of any maceration of the meniscus in any of the 3 locations of the medial compartment (OR = 2.96 95% CI [1.51,5.82]) when compared to matched non-TKR knees.
These associations were not observed for the lateral compartment or for meniscal extrusion.
Conclusions: Presence of maceration of the medial meniscal body and maceration of the medial posterior horn is more likely among TKR knees when compared to non-TKR knees. Further, risk for TKR is increased when a maximum grade of meniscal maceration is present in any of the analyzed medial meniscal locations. These data provide additional support to the importance of meniscal pathology in predicting important clinical outcomes.

Table 1. Comparison of meniscal damage and extrusion at T0 in TKR knees vs. matched non-TKR knees

MRI biomarker	N (%)	Odds of medial meniscal abnormality KR compared to no KR Odds Ratio (95% confidence intervals)	N (%)	Odds of lateral meniscal abnormality KR compared to no KR Odds Ratio (95% confidence intervals)
Anterior horn				
0/1	203 (83.9)	Reference	189 (78.4)	Reference
Max. 2-5 (tear)	6 (2.5)	5.00 (0.58,42.80)	13 (5.4)	0.89 (0.23,3.38)
Max 6-8 (maceration)	33 (13.6)	1.56 (0.68, 3.59)	39 (16.2)	1.36 (0.66,2.82)
Body				
0/1	117 (48.4)	Reference	181 (74.8)	Reference
2-5 (tear)	7 (2.9)	0.68 (0.12,3.76)	14 (5.8)	0.58 (0.19,1.73)
6-8 (maceration)	118 (48.8)	2.78 (1.50,5.16) *	47 (19.4)	1.29 (0.66, 2.54)
Posterior horn				
0/1	96 (39.7)	Reference	184 (76.4)	Reference
2-5 (tear)	56 (23.1)	1.05 (0.54,2.04)	18 (7.5)	1.68 (0.59,4.72)
6-8 (maceration)	90 (37.2)	2.20 (1.07,4.53) *	39 (16.2)	1.02 (0.50,2.05)
Maximum grade in any of 3 locations				
0 and 1	81 (33.5)	Reference	164 (67.8)	Reference
2-5 (tear)	33 (13.6)	1.47 (0.62,3.49)	18 (7.4)	0.84 (0.33,2.18)
6-8 (maceration)	128 (52.9)	2.96 (1.51,5.82) *	60 (24.8)	1.16 (0.64,2.11)
Meniscal extrusion				
No meniscal extrusion	48 (19.9)	Reference	184 (76.4)	Reference
Any mensical extrusion	193 (80.1)	1.54 (0.77,3.10)	57 (23.6)	1.15 (0.63,2.09)

* statistically significant at p<0.05